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The Waverly Oaks.

THERE is in Belmont, one of the suburbs of Boston, and formerly a part of the ancient town of Watertown, a group of Oaks which has come to be known in recent years as the Waverly Oaks, from the village near which they stand. These Waverly Oaks are, all things considered, the most interesting trees in eastern Massachusetts, and although there are larger Oaks in New England and in the Middle States, a group containing so many large trees is not often seen now anywhere in eastern America. There are in this group twenty-three large Oaks and one large Elm growing on an area of two or three acres. The Oaks are all White Oaks, with the exception of a single Swamp White Oak. They occupy mainly the slopes of a terminal moraine, along the base of which flows Beaver Brook, the "Sweet Beaver, child of forest still," sung by Lowell. The Waverly Oaks are well known to all Bostonians interested in nature, and strangers not infrequently make the pilgrimage to Belmont to look upon these venerable products of Massachusetts soil. It is strange, therefore, that so little has ever been printed about these trees. Emerson, the historian of the trees of Massachusetts, makes no reference to them. Piper, who wrote of the trees of America, and who lived not very far away, in Malden, seems to have overlooked them, and traveled all the way to Stowe to find his typical New England White Oak. Brown, another Massachusetts man who published books about trees, passed them by without a word. The poets and philosophers of Cambridge and Concord, who doubtless often passed by Beaver Brook, make no mention of its great trees, which first appear in print, apparently, in 1881, in *Harper's Magazine*, where Mr. F. H. Underwood, writing of James Russell Lowell, speaks of them on page 262 as "the only group of aboriginal trees standing on the Massachusetts coast"—a statement to which some exceptions might be taken. The Committee on Grounds of the Massachusetts Horticultural Society visited the Waverly Oaks on the 28th of June, 1884, and the chairman, Mr. J. G. Barker, joined to its report printed in the transactions of the society for that year the other short account of the trees which has appeared coupled with a timely suggestion for their preservation.

This suggestion we desire to repeat and enforce; and that the public may know the beauty of these trees and of the spot where they grow, we reproduce on page 91 a view taken by Dr. W. H. Rollins, of Boston, showing a portion of the group.

The age which these trees have attained and the vicissitudes they have survived entitle them to respect, and the people of Massachusetts might wisely secure their preservation through the purchase and dedication to public use of the land on which they stand.

The age of these old Oaks can only be surmised. One famous naturalist is said to have declared that the smallest of them had existed through more than a thousand years. It is probable that this statement is greatly exaggerated. The largest tree in the group girths seventeen feet three inches at three and a half feet from the ground.* The principal tree in our illustration is smaller, with a girth of only thirteen feet four inches, measured at the same distance from the ground. An actual examination of the wood of this tree shows that it has increased three inches in diameter during the last twenty-four years. Had it made the same rate of growth during the whole period of its existence, it would have been 408 years old, and the largest tree in the group would be, with the same rate of increase, 508 years old. It is probable that they are both younger than these estimates make them. They may have grown less rapidly for several years at the beginning of their life, but there must have been a number of years, probably several hundred, when they increased more rapidly in diameter than they have during the last quarter of a century. The appearance of the trees justifies this supposition. They are still healthy, and are growing with considerable vigor; but there can be no doubt that their period of most rapid development has passed, or that, while they may continue, with proper care, to live and increase slowly for centuries perhaps, they will grow less rapidly now than they did one or two hundred years ago. But after making all due allowance for differences in the rate of growth at different periods in the existence of these trees, it is safe to surmise that the youngest of them had attained to some size before the Pilgrims landed on the shores of Massachusetts Bay, and that the oldest was at that time a tree of some size.

The ponderous lateral branches of these trees, reaching out in every direction, shows that they grew up in the open ground, which must have been cleared four or five hundred years ago, if, indeed, the dry and gravelly soil ever produced any other forest growth contemporaneously with these Oaks.

The Waverly Oaks grow within a few hundred yards of the station at Waverly, on the Boston & Fitchburg Railroad, on a piece of ground directly opposite the property of the trustees of the Massachusetts General Hospital, occupied by the country home of that institution. The whole region

* Messrs. L. L. Dame and Henry Brooks, of West Medford, who are engaged in preparing for publication an account of some of the most remarkable Elms and other trees of Massachusetts, obligingly send the following measurement of the largest of the Waverly Oaks, which stands on a steep slope: At five feet from the lower side, twenty-one feet six inches; at five feet from the upper side, sixteen feet six inches. There is a difference of several feet in the height of the ground at the upper and at the lower sides of this tree, and our measurement of seventeen feet three inches, taken at three feet and a half from the ground on the lower side, is perhaps as correct as any measurement can be made. Other measurements of Massachusetts White Oaks sent us by Messrs. Dame and Brooks are seventeen feet eight inches for the Oak at Bernardston; twenty-four feet five inches for the Oak at Boylston; fifteen feet ten and a half inches for the Avery Oak at Dedham; fourteen feet one inch for the Elliott Oak at Natick; and thirteen feet seven inches for the Topsfield Oak. These measurements are all made at five feet from the ground. A White Oak recently cut on the estate of Peter C. Brooks, Esq., of West Medford, Massachusetts, measured at eight feet from the ground eight feet ten inches, and had approximately 200 layers of annual growth, as counted by Dame and Brooks.

Mr. John Robinson, in his account of the "Woody Plants of Essex County, Massachusetts," gives the following measurement of White Oaks: The Topsfield Oak, in 1875, had a circumference one foot from the ground of nineteen feet seven inches; the same trunk measured sixteen feet eleven inches at three feet from the ground, and twelve feet eleven inches at five feet from the ground. Two White Oaks on the Burleigh Farm, in Danvers, measured respectively nineteen feet and seventeen feet ten inches, both measurements being made at the ground, the first measuring thirteen feet six inches at six feet from the ground and the second twelve feet at five feet from the ground.

is undergoing rapid development, and houses are springing up on every side. The establishment of a small public park at this place, which need not exceed three or four acres in extent to accomplish this object, would protect the trees from the dangers which now threaten them, and would make a valuable and interesting public resort within walking or driving distance of the homes of a very large number of people.

Mr. J. G. Lemmon, the accomplished botanist of the California State Board of Forestry, discusses the problem of forest fires in the seventh bulletin issued by that board. "It is," he says, "a common observation that forests are usually bordered by a fringe of saplings and these by points and patches of seedlings all apparently flourishing finely and promising a material enlargement of the forest area; and scarce an instance is known where an edge of a forest is dying off by the natural course of events. The question arises, is this a normal attribute of forest-growth, or of forest-development? Did they always thus try to expand, or has some change occurred to them or their environment that now enables them to increase their periphery? The answer to the problem is contained in the two English words—Indian fires. The Indian desired open prairies and intervals for his game, that the latter might find better forage thereon, and also that he might the better mark them for his arrows. With the retirement of the Indian and the suspension of the annual forest and prairie-fires, the forests freely expand, and it is well known that young forests are covering large areas of the eastern United States, and it is believed that the great diluvian plains of the central west and of the Pacific slope might in time be covered with trees, if the practice of modern agriculturists did not serve to prevent their growth, desirable or otherwise. More than all the destructive processes of the lumbermen, and the close grazing of the flocks and herds of the stock raiser, is the ruin of the fire fiend; and against him the blazing forests, the menaced settlements and the ruined inhabitants of California appeal to citizens generally and legislatures especially for instant and adequate protection." It is by fires, as Mr. Lemmon points out, that "young seedlings are destroyed utterly, and usually the saplings are killed off, not consumed, while on a section of country from which the whole tree-growths have been removed after a fire, weeds and brambles will not come in until many years after. And how shall the crying evil of forest fires be stopped, where is the remedy, and who shall apply it?"

Mr. Lemmon is not the first thoughtful observer to ask these questions. The answer, perhaps, is wise legislation, but legislation will be useless unless it rests on public sentiment; and public sentiment in this country will not save the forests until the popular mind is more highly educated than it is to-day upon all subjects relating to the forests and their value to the nation.

The Coast of Maine.

FROM Cape Cod, Massachusetts, to Cape Sable, Nova Scotia, the broad entrance of the Gulf of Maine is two hundred miles wide, and it is one hundred miles from each of these capes to the corresponding ends of the coast of Maine at Kittery and Quoddy. Thus Maine squarely faces the wide opening between the capes, while to the east and west, beyond her limits, stretch two great offshoots of the gulf, the bays of Fundy and of Massachusetts. The latter and lesser bay presents a south shore built mostly of sands and gravels in beaches and bluffs, and a north shore of bold and enduring rocks, both already overgrown with seaside hotels and cottages. The Bay of Fundy, on the other hand, is little resorted to for pleasure. Its shores in many parts are grandly high and bold; but its waters are moved by such rushing tides, and its coasts are so frequently wrapt in cold fogs, that it will doubtless remain comparatively an unfrequented region.

Along the coast of Maine, stretched for two hundred miles from bay to bay, scenery and climate change from the Massachusetts to the Fundy type. At Boston the average temperature of July is 70°; at Eastport, at the farther end of Maine, it is 61°. No such coolness is to be found along the thousand miles of monotonous sand beach which front the Atlantic south of the Gulf of Maine; and though the coolness of the waters of the gulf precludes most persons from sea bathing, this freshness of the air will always be an irresistible attraction to many thousands of dwellers in hot cities. Again, in contrast with the southern sea-beaches, the scenery of the Maine coast is exceedingly interesting and refreshing. The mere map of it is most attractive. Beginning at Piscataqua River, a deep estuary whose swift tides flow through an archipelago of rocks and small islands, the shore is at first made up of low ledges forming ragged points, connected by sand or pebble beaches, where farmers gather rock-weed after storms. Seaward lies a group of dangerous rocks, the Isles of Shoals. Beyond the tortuous outlet of York River and the Short and Long Sands of York, Cape Neddick and Bald Head lift high rocks toward the sea, and behind them rises Agamenticus Hill, a conspicuous blue landmark sometimes visible from Cape Ann, in Massachusetts. Low and sandy coasts succeed, fronting the old towns of Wells and Kennebunk. Cape Porpoise follows, a confused mass of rocky islets, salt marshes and tidal flats; then more long and short beaches, a lagoon called Biddeford Pool, the mouth of Saco River barred by its washings from the White Hills, more beaches, and so to Cape Elizabeth, a broad wedge of rock pushed out to sea as if to mark the entrance to the land-locked harbor of Portland.

Thus far the coast is sufficiently rich in varied scenery—in shores now high, now low, now wooded and now bare, now gentle and now rough; first thrust seaward in rocky capes, then swept inland in curving beaches, and now and again broken by the outlets of small rivers. Cape Elizabeth ends this scenery, and introduces the voyager to a type still more intricate, picturesque and distinctive. Casco Bay, with its many branches running inland and its peninsulas and islands stretching seaward, is the first of a succession of bays, "thoroughfares" and "reaches" which line the coast almost all the rest of the way to Quoddy. The ragged edge of the mainland becomes lost behind a maze of rock-bound islands, and appears but seldom where the surf can strike it. The salt water penetrates in deep and narrow channels into the very woods, ebbs and flows in hundreds of frequented and unfrequented harbors, and enters into countless hidden nooks and coves and narrows. Sand beaches become rare, and great and small "sea walls" of worn stones or pebbles take their place. Islands, islets, and ledges both dry and sunken, are strewn on every hand. The tides flow among them with increasing force, and the fog wraps them from sight more and more frequently as the Bay of Fundy is approached. Great cliffs are rare until Grand Manan is reached, and high hills come down to the sea only by Penobscot Bay and at Mount Desert; but, on the other hand, the variety of lesser topographic forms is very great. In Casco Bay, for instance, the rocks trend north-east and south-west, and all the crowded islands run out into reefs in these directions. Penobscot Bay presents wide stretches of open water divided by well massed islands, but still preserves a fine breadth of effect; and these islands differ greatly in form and character, according as they are built of hard and glaciated granite or of altered stratified rocks. The border bay of Passamaquoddy is distinguished by fine headlands, which terminate islands, generally lower than the heads. In like manner the sounds and fiord-like rivers differ much from each other. For instance, the Kennebec River is extremely narrow, and many bold knobs of rock turn it this way and that; but the neighboring Sheepscot is fully three miles broad at its mouth, and this noble width contracts but slowly; while the Penobscot above the Narrows takes on such a gentle appearance as to be hardly recognizable as a river of eastern Maine, the general aspect of this part of the coast being distinctly wild and untamable.

Doubtless the raggedness of the rocky shore is the first cause of the almost forbidding aspect of the region, but the changed character of the sea-coast woods is a second cause. Beyond Cape Elizabeth, if capes and islands are wooded at all, it is with the dark, stiff cresting of Spruce, Fir or Pine, fringed perhaps with Birch and Mountain Ash. Near Kittery fine Elms and even Hickories may be seen on the open shore, but there is a gradual dying out of many familiar species as the coast is traversed eastward. Thus Holly and Inkberry, together with Prickly Ash, Flowering Dogwood and Sassafras, are not seen near the sea north of Massachusetts Bay. White Cedar, after following the coast all the way from the Gulf of Mexico, dies out near Kittery. York River is said to see the last Buttonwoods, Saco River the last Chestnuts, and the Kennebec the last Tupelos and Hickories. Conversely, this coast has its many forerunners of the flora of the far north. While

the White Pine is met with all along shore north of New Jersey, the Red Pine first appears by Massachusetts Bay and the Gray Pine by Mt. Desert. The Arbor-vitæ is first met with near the Kennebec. The Balsam Fir and the Black and White Spruces show themselves on no coasts south of Cape Ann, and do not abound until Cape Elizabeth is passed. It is the blackness of these dwarf coniferous woods which, with the desolation of the surf-beaten ledges and the frequent coming of the fog, impresses the traveler with the fact that this is a really wild and sub-arctic shore, where strange red-men's names for islands, capes and rivers—names such as Medomak, Muscongus, Pemaquid, Megunticook, Eggemoggin, Moosabec and Schoodic—seem altogether fitting.

The human story of the coast of Maine is almost as picturesque and varied as its scenery. This coast was first frequented by stray French fishing vessels, and first scientifically explored by Samuel de Champlain, whose narrative of his adventures is still delightful reading. Fruitless attempts at settlement followed, led by French knights at Saint Croix, by English cavaliers at Sagadahock and by French Jesuits at Mt. Desert; all of them years in advance of the English Colony of New Plymouth. Then followed a long period of fishing and fur trading, during which Maine belonged to neither New France nor New England, and a genuine border warfare was the result. Two rival Frenchmen also fought and besieged each other in truly feudal fashion at Penobscot and Saint John. Again, while the long French and Indian wars lasted, this coast saw more fighting. The older settlements west of Cape Elizabeth were sacked several times, and even the English stronghold at Pemaquid was captured; but the forest allies of the French Baron Saint Castin were beaten in the end. The numerous French names for points on the eastern coast bear witness to the long French occupation; as for instance, Grand and Petit Manan, Bois Bubert, Monts Déserts and Isle au Hault, and Burnt Coat, apparently English, but really a mistranslation of the French Côte Brulé.

No Englishmen settled beyond Penobscot until after the capture of Quebec; and when they did, they, as Yankees, had to take part in still more fighting in the wars of the Revolution and of 1812. The settlers first fished and hunted, then cut hay on the salt marshes and timber in the great woods, and in later years took to ship building, and later still to stone quarrying and ice harvesting, and, near Rockland, to lime burning. These works are still the business of the coast. Even hunting is carried on at certain seasons in the eastern counties, where deer are still numerous. All the large Pine and Spruce of the shore woods have been cut; but Bangor still sends down Penobscot Bay a fleet of lumber schooners every time the wind blows from the north; and as for fishing, fleets of more than two hundred graceful vessels may often be seen in port together waiting the end of a storm.

It was about 1860 that what may be called the discovery of the picturesqueness and the summer-time healthfulness of the coast of Maine took place. Only the beaches of the western quarter of the shore were at first occupied by hotels; but when the poor hamlet of Bar Harbor leaped into fame through the resort to it of a few well known landscape painters, it became evident that the whole coast was destined to be a much frequented summer resort. At present, York, Kennebunkport, Biddeford Pool and Old Orchard Beach, together with the Casco Islands, Booth Bay, Camden, Mt. Desert and Campobello, are a few of the more populous neighborhoods; but summer hotels are now scattered all along the shore, and colonies of summer villas of all grades of costliness occupy many of the more accessible capes and islands. Thus there are many cottages at York, and the islands near Portland are fairly covered with cheap structures. Squirrel Island in Booth Bay is another nest of small houses, and Bar Harbor is a summer city surrounded by a multitude of very costly and elaborate wooden palaces. The finest parts of the coast are already controlled by land companies and speculators, while the natives' minds are inflamed by the high prices which the once worthless shore lands are now supposed to command.

The spectacle of thousands upon thousands of people able to spend annually several weeks or months of summer in healthful life by the sea-shore is very American and very pleasant, and the impartial observer can find but two points about it which are in any considerable degree discouraging or dangerous. The lamentable feature of the situation is the small amount of thought and attention given to considerations of appropriateness and beauty by the builders and inhabitants of the summer colonies of the coast. Indifference in these matters works ill results everywhere, but nowhere is lack of taste quite so conspicuous as on the sea-shore. Both corporations and individuals are guilty on this head. More than one booming land company has hastily divided and sold its rough ledges in rectangular lots, whose lines bear no relation to the forms of the ground, so that houses cannot be well placed. The squalid aspect of the public parts of these settlements, the shabby plank walks and the unkempt roadways, are other causes of reproach. The houses themselves, if cheap, are too often vulgarly ornamented, and if costly, are generally absurdly pretentious. Even the government, which has lately been rebuilding many of the light-house keepers' dwellings, has substituted for the simple, low and entirely fitting structures of a former generation, a thin-walled and small-chimneyed type of house, such as is common in the suburbs of our cities. One of these perched on a sea cliff is an abomination, and might well have illustrated the mournful remark of a recent writer in the *Atlantic Monthly*, who pointed out that American indifference to beauty cannot be caused by the newness of our civilization, for when this was still newer we built both more appropriately and picturesquely than we commonly do now. Again, in the treatment of the ground about their houses, the millionaires of Bar Harbor are quite as apt to err as are the humbler cottagers of Squirrel Island. Smooth lawns, made of imported soil, and kept green only by continual watering, furnish a means of displaying wealth, but they cannot be fittingly united with scenery which is characterized by rough ledges and scrubby woods. On this rough coast level grass will please when it is joined to a house and enclosed by walls. In the open ground it can hardly ever be in keeping. Similarly incongruous are flower-beds scattered over rocky and uneven ground, set between the trunks of Pitch Pines, or perched on the tops of whaleback ledges; and yet such things are common sights at Bar Harbor.

The real danger of the present situation is that this annual flood of humanity, with its permanent structures for shelter, may so completely overflow and occupy the limited stretch of coast which it invades, as to rob it of that flavor of wildness and remoteness which hitherto has hung about it, and which in great measure constitutes its refreshing charm. A surf-beaten headland may be crowned by a lighthouse tower without losing its dignity and impressiveness, but it cannot be dotted with frail cottages without suffering a woeful fall. A lonely fiord shut in by dark woods, where the fog lingers in wreaths, as it comes and goes, loses its charm whenever even one bank is stripped naked, and streets of buildings are substituted for the Spruces and Pines. A few rich men, realizing this danger, have surrounded themselves with considerable tracts of land solely with the intention of preserving the natural aspect; and at least one hotel company, by buying almost the whole of the wild island of Campobello, has saved for the patrons of its houses a large region of unspoiled scenery. The readers of GARDEN AND FOREST stand in need of no argument to prove the importance to human happiness of that refreshing antidote to city life which fine natural scenery supplies, nor is it necessary to remind them that love of beauty and of art must surely die if it be cut at its roots by destroying or vulgarizing the beauty of nature. "Men cannot love art well until they love what she mirrors better," says Mr. Ruskin.

The United States have but this one short stretch of Atlantic sea-coast where a pleasant summer climate and real picturesqueness of scenery are to be found together. Can nothing be done to preserve for the use and enjoyment of the great unorganized body of the common people some fine parts, at least, of this sea-side wilderness of Maine? It would seem as if the mere self-interest of hotel proprietors and land-owners would have accomplished much more in this direction than it yet has. If, for instance, East Point near York, or Dice's Head at Castine, or Great Head near Bar Harbor, should be fenced off as private property, all the other property-owners of the neighborhood would have to subtract something from the value of their estates. And, conversely, if these or other like points of vantage, or any of the ancient border forts, were preserved to public uses by local associations or by the commonwealth, every estate and every form of property in the neighborhood would gain in value. Public-spirited men would doubtless give to such associations rights of way, and even lands occasionally, and the raising of money for the purchase of favorite points might not prove to be so difficult as at first it seems. The present year should see, all up and down the shore, the beginning of a movement in the direction here indicated. In many parts of the coast it is full time decisive action was taken, and if the State of Maine should by suitable legislation encourage the formation of associations for the purpose of preserving chosen parts of her coast scenery, she would not only do herself honor, but would secure for the future an important element in her material prosperity.

Boston. *Charles Eliot.*

Entomological.

An Enemy to the Egyptian Lotus.

In Garden and Forest for April 10th, 1889, was an interesting account of the naturalization of the Oriental Nelumbium in New Jersey, by Mr. E. D. Sturtevant, who has done more than any other man to popularize the cultivation of this plant. Beauty and poetry, combined, are represented by the flower and its traditions, but neither will serve to protect it against the sordid prose of insect attack. An enemy has appeared that annually ruins many of the plants, eating their leaves, buds, seeds, and even into the stem. The caterpillar —for it is a caterpillar—is a typical borer, living primarily in the leaf and flower stems; but as soon as buds form, they are attacked; the larva bores into the side and feeds so judiciously that the bud continues to grow, and will even open in due time, only to fall apart and to show a mass of black frass in place of a beautiful flower. The seed-pods also are attractive to the larvæ, and the seeds are eaten before they attain maturity. Unfortunately the insects seem to be increasing in number, and bid fair to render Lotus-growing unsatisfactory. To Mr. J. Turner Brakeley, of Bordentown, I owe my introduction to the larvæ infesting these plants, the specimens sent me being from Mr. Sturtevant's ponds. According to the statements made, the larva, when it first appears, lives on the outside of the leaves in a little silken tent, but very soon gets under cover somewhere, either in bud, stem or seed-capsule, whichever is most handy. It continues its work during the summer, and in fact until frost puts a period to the life of the leaves. It was in the latter part of July when specimens of infested stems, buds and seed-capsules reached me, and there were sometimes three to four larvæ in a single stem. In general color the caterpillars are a dirty white, with a more or less evident reddish tint, and rather stout of build, the head and dorsal plate smooth, yellowish, mottled with red-brown. Each body segment has two larger dorsal yellowish tubercles, one large tubercle each side, and usually two smaller, also yellowish, tubercles near the posterior end of the segment. The annexed figure will give a fair idea of the general form, and the mouth parts or instruments of destruction are also shown in detail. When full grown the larva is nearly an inch in length, and then spins a rather flattened cocoon of a quite dense texture inside the stem and changes to a blackish brown pupa about half an inch in length. Towards the middle and latter part of August the moths issued, and proved to be a species of Botis not previously described. From its food plant I name it *Botis nelumbialis*.

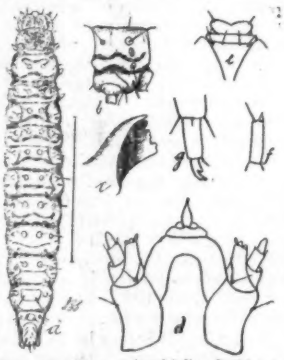


Fig. 18.—Botis nelumbialis, Smith; *a*, larva from above; *b*, a single segment from side, showing sculpture; *c*, mandible of larva; *d*, maxillæ and palpi; *e*, clypeus; *f*, antenna; *g*, leg. All greatly enlarged.

In general color it varies from a pale clay yellow to a powdery, rusty red, all intervening shades being represented. Two dentate dark lines cross the wing, one near the base, the other toward the outer margin of the wing. Usually there is a dusky discal spot and a dark shade close to the outer margin, but sometimes only the median lines are visible. The figure shows three forms of the new species, about natural size. These insects promise to become quite a serious pest, and it is not easy to suggest a certain remedy. Blackbirds are said to eat the larvæ, while they are exposed. Where there are but a few of the plants, they can be easily kept clean by picking them off before they take to shelter. It is probable that in their method of passing the winter we shall have an opportunity to control them. If, as I suspect, the winter is passed in the pupa state in the stem, the collection and destruction of the dry stalks would kill the specimens contained in them, and reduce the risk of injury the following season. I should advise the cutting off, as soon as could be done without danger of injury to the plant, of all the parts above the water line, the cut material to be buried deeply enough to prevent all chance of the larvæ working their way out.

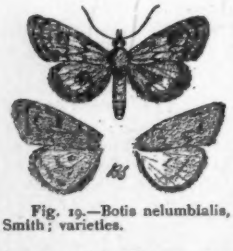


Fig. 19.—Botis nelumbialis, Smith; varieties.

Rutgers College, February 8th, 1890. *John B. Smith.*

New or Little Known Plants.

Gladiolus Turicensis.

We are indebted to Messrs. Froebel & Co., of Zurich, for the drawing from which has been made the illustration, on page 89, of *Gladiolus Turicensis*, concerning which they send the following note:

"Mr. Max Leichtlin, of Baden-Baden, was the first to improve garden Gladioli by an infusion of the blood of *G. Saundersii*. The first variety obtained in this way he named *G. Saundersii superbus*. In 1880 we produced two varieties by crossing *G. purpureo-auratus* with *G. Gandavensis*, which we named *G. Froebeli* and *G. Engesseri*. These were both good varieties, and proved perfectly hardy. *G. Brineri*, of the same parentage, followed in 1885. *G. Turicensis* is our last production, obtained by a cross between a large-flowered variety of *G. Gandavensis* with *G. Saundersii superbus*. The flowers of *G. Turicensis* are a fine purplish crimson color, the lower segments of the perianth beautifully marked with white. When fully expanded the flowers are upward of three inches across. The flowers of *G. Saundersii* have the bad habit of bending in toward the stem, while those of this hybrid, when fully expanded, look one in the face, so to speak. *G. Turicensis* is a plant of exceedingly vigorous growth, the spikes of flowers attaining the length of two feet. It is a free bloomer, and seems well adapted to plant in beds where masses of flowers of one color are needed."

Should this plant prove, as it is predicted, perfectly hardy, it will make, certainly, one of the most valuable additions to the list of hardy summer-blooming bulbs which has appeared for some time. Whether it is hardy or not, however, it is a plant of great value, which will be watched with interest by all growers of Gladioli, not only for the beauty of its flowers, but as an element of possible future improvement in garden varieties of Gladiolus.

Foreign Correspondence.

Berlin Letter.

Hyacinths bloomed much earlier than usual this year, such varieties as Homer, Maria Cornelia, Wilhelm I. and Norma being in flower from ten days to two weeks before their usual season. The same remark is true of the Tulips, and it is interesting to know that the bulbs grown here are forced more easily and flower earlier than Holland bulbs, a fact which has been known to Berlin gardeners for some years past. The culture of spring bulbs, which was once a prominent industry here, has fallen off within the last ten years, but the tide has again turned, and large fields of Hyacinths, Tulips and Scillas can now be seen, a result largely due to the energy and enterprise of Mr. Spath. Old gardeners say that the bulbs have not flowered so early as they have this year since 1840. They attribute this fact to the very hot and dry May of last year, which in their opinion ripened up the bulbs quickly and perfectly. I am not sure, however, that this is the true cause. It is well known that plants which suffer so much from dryness, or any other cause, that they are in danger of death, at once begin to develop flower-buds. It is as if the instinct of the plant for the preservation of its species asserts itself whenever the individual plant is threatened with extinction. Every gardener knows that plants which are to produce abundant foliage should be well fertilized, while plants which are needed for bloom should be kept in more or less sterile soil. In consideration of this it is my opinion that the early flowering of these bulbs is really due to the hot and dry May, although not to the fact that the bulbs were ripened well, but rather because in their enfeebled condition they followed the general law and gave all their energies to the production of bulbs.

This opinion is based on practical experience. To decide this and many other questions with accuracy would require the work of horticultural experiment stations, but these are entirely lacking in Germany. We have fine horticultural schools where gardeners may learn all that is necessary for them to know, in practice, of plant life, but a station in which experiments can be made on the same broad scale as they are made in the agricultural stations has not yet been established in Germany. How strong the interest here is in the education of young gardeners appears from the fact that the Royal

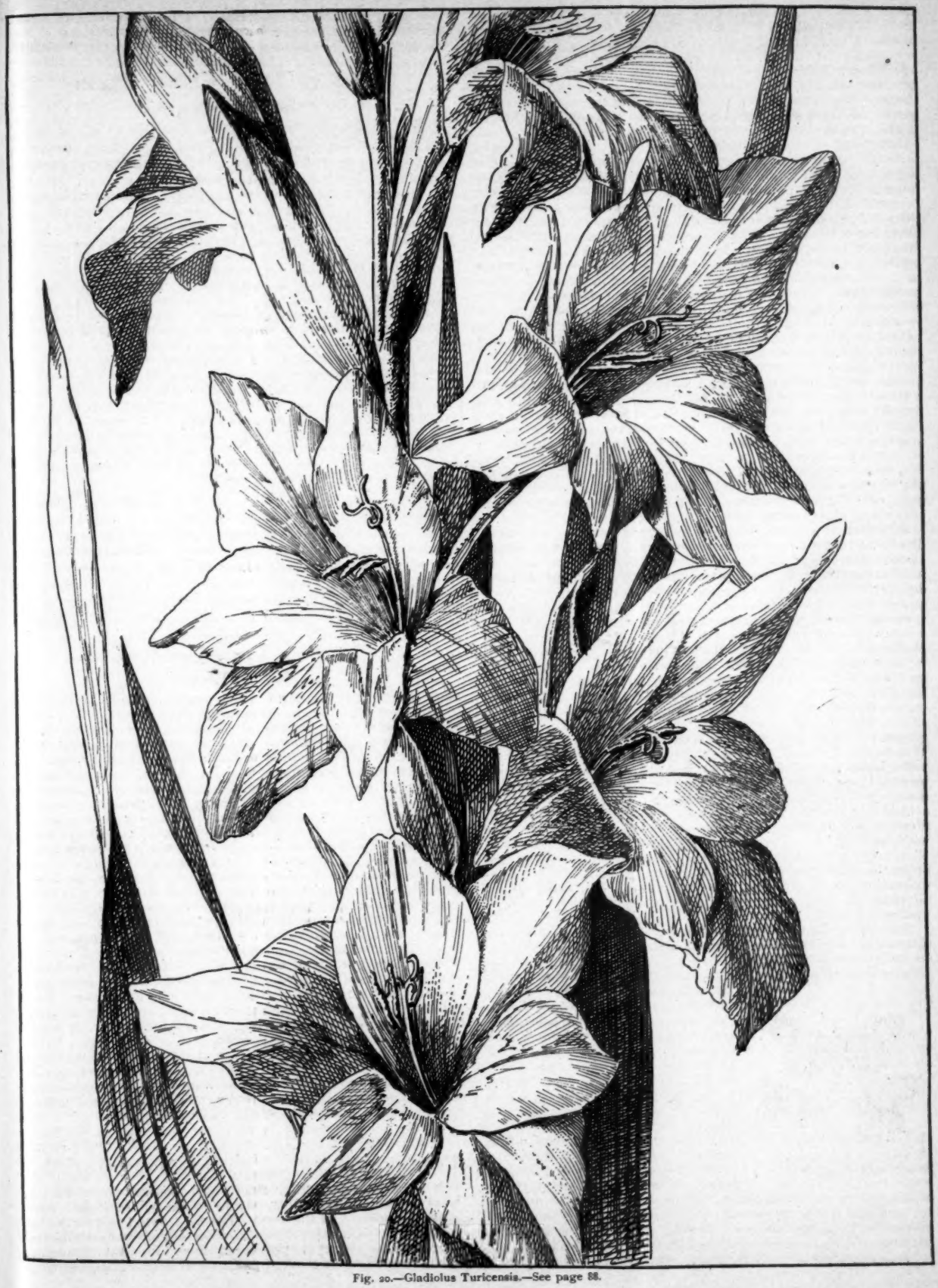


Fig. 20.—Gladiolus Turicensis.—See page 88.

Land Culture Commission, in November last year, recommended a grant for a horticultural school, as well as the establishment of a branch for horticultural art in one of the high schools of Dresden. The establishment of a horticultural academy similar to the agricultural academies is merely a question of time, but more necessary now than all this seems the establishment of a horticultural experiment station. The questions to be solved are so numerous that opportunities for usefulness would at once present themselves.

An event of the first importance will be the great International Horticultural Exhibition which is to be held in Berlin from the 25th of April to the 5th of May. Hitherto such exhibitions have been great plant-shows where the public could see the progress of horticulture in well grown specimens. Now and then there was a space for garden-plans, or a carpet-bed attracted attention. Sometimes, also, arrangements of cut flowers were to be seen; but this exhibition will have some entirely different features. Exhibitors will have opportunity to show the public how plants can be used for decoration on different occasions. Two large banquet halls—each one sixty-two and a half feet wide by eighty feet long—will be provided, and these, with the tables, are to be decorated in competition. Then there will be a chapel to show decorations for nuptial ceremonies, baptisms, etc., and besides these, ten rooms, each twenty-three feet long and twenty feet eight inches wide, to be considered as parlors, dining-rooms, etc. This will give opportunity to show how different rooms can best be decorated for different occasions. There will be two yards connected with houses, one furnished with porticoes and the other with balconies, both of which are subjects for competitive decoration, not to mention windows, pergolas, pavilions and the like. The entire exhibition palace will be 625 feet in length and 295 feet in breadth, with a hall for meetings, one for exhibitions, and one for landscape-gardening and horticultural literature.

Other space will be divided as follows: For the decorative display, 4,200 square feet; for stove and greenhouse plants, 14,000 square feet; for Roses, forced flowering shrubs, perennial plants and bulbs, each 3,150 square feet; for nursery products, 7,200 square feet; for cut flowers, grasses, etc., 2,650 square feet; for vegetables and fruits, 650 square feet.

Besides these there will be hot-houses, greenhouses, etc., usually in full operation, so that Orchids and other stove plants will find comfortable quarters in a hot-house constructed within the exhibition limits. The houses are all to be entered in competition, as will be the boilers and other methods of heating. A large hall in connection with the exhibition palace will be devoted to garden implements and machinery.

This exhibition, international as it is, will show phases of gardening quite different from those seen in the older ones. The number of medals and prizes is enormous. The Emperor himself has offered a large gold medal as the highest prize. It would add greatly to the attractiveness and value of the show if American gardeners would offer examples of their art, so that their styles of decoration could be compared with those which prevail here. That foreigners can compete here with success was proved at the last Chrysanthemum show in November, when two English gardeners received the first prize, the gold medal. Large collections are already in preparation in the Riviera for this exhibition. One nurseryman alone is preparing to send four railway cars full of Palms, Crotons and the like.

Palm culture in the open air is making some headway in Germany. In the Berlin botanical gardens this winter, which so far has been very mild, an experiment has been made with *Chamærops excelsa*. In Altenburg, Thuringia, a Mr. Köhler has succeeded, it is said, in growing Phœnix, Pritchardia, Chamærops, *Cocos Wedelliana* and *Cycas revoluta* out-of-doors.

In the flower shops now *Azalea Indica* is the prevailing plant. Besides these, forced Roses of remarkable merit abound, and though the prices are very high there is a great demand for them.

Udo Dammer.

Berlin.

Cultural Department.

Fern Notes.

THE remarks of Mr. Watson in his London Letter of a few weeks since to the effect that popular interest in Fern collections in England seems to have fallen to a low ebb of late years, reminds us that a very similar state of affairs prevails on this side of the ocean, for while attention is frequently called to the rapid increase in numbers and varieties contained in the various collections of Orchids in the United States, in both private and commercial establishments, yet the Fern collections in the same wide territory, that are worthy of special mention, may perhaps be counted on the fingers of one hand. Now this is not intended to imply that the Orchids are not worthy of all the publicity that has been given them, but merely as a statement of fact, and though fine Ferns are seen at some of the exhibitions, yet it must be conceded that they are somewhat scattered.

While there is no doubt that the use of small Ferns in floral arrangements has very largely increased during a few years past, and that in consequence they have been grown by thousands in a number of commercial places, yet the species and varieties so grown are very few, being limited to some of those easily-propagated and rapid-growing sorts that require but little special attention. In fact, a list of a dozen to fifteen names would comprise those most used in this way, and might read as follows: *Adiantum cuneatum, A. pubescens, A. gracillimum*, and in smaller quantities *A. Farleyense, Pteris serrulata* and *P. serrulata cristata, P. Cretica* and its varieties, *P. argyræa, P. tremula, Onychium Japonicum, Davallia tenuifolia stricta, Asplenium Belangeri, Doryopteris palmata* and *Nephrodium Sieboldii*. Occasionally a batch of *Lygodium Japonicum* is seen grown on the same plan as *Myrsiphyllum asparagoides* (that is, on strings for wreathing), but this is usually in limited quantities.

It would, however, be quite an easy task for any Fern-lover to compile quite a long catalogue of distinct species that may readily be grown in cool-house temperature (about forty-five degrees at night) and in a house so located as not to be entirely satisfactory for the cultivation of flowering plants. In such a house may be grown a number of different types, from moderately developed tree-ferns down to such charming miniature ferns as *Davallia parvula* and *D. alpina*.

Among the larger growing species specially adapted to cool-house culture may be mentioned some of the Alsophilas, as *A. australis, A. excelsa* and *A. Capensis*, all of these being noble species and of vigorous growth. *Dicksonia antarctica* is an indispensable sort for this purpose, being highly ornamental either in a small plant, or when it has attained its full development and presents a massive trunk twenty feet or more in height and possibly one foot in diameter. *Dicksonia squarrosa* and *D. Youngiæ* are also admirable species and somewhat smaller-growing than the foregoing. *Dicksonia Barometz* is another valuable fern of strong growth, though not arborescent in habit. This plant throws up its dark green bipinnate fronds to a height of five to six feet, the fronds being freely produced from a very hairy decumbent rhizome.

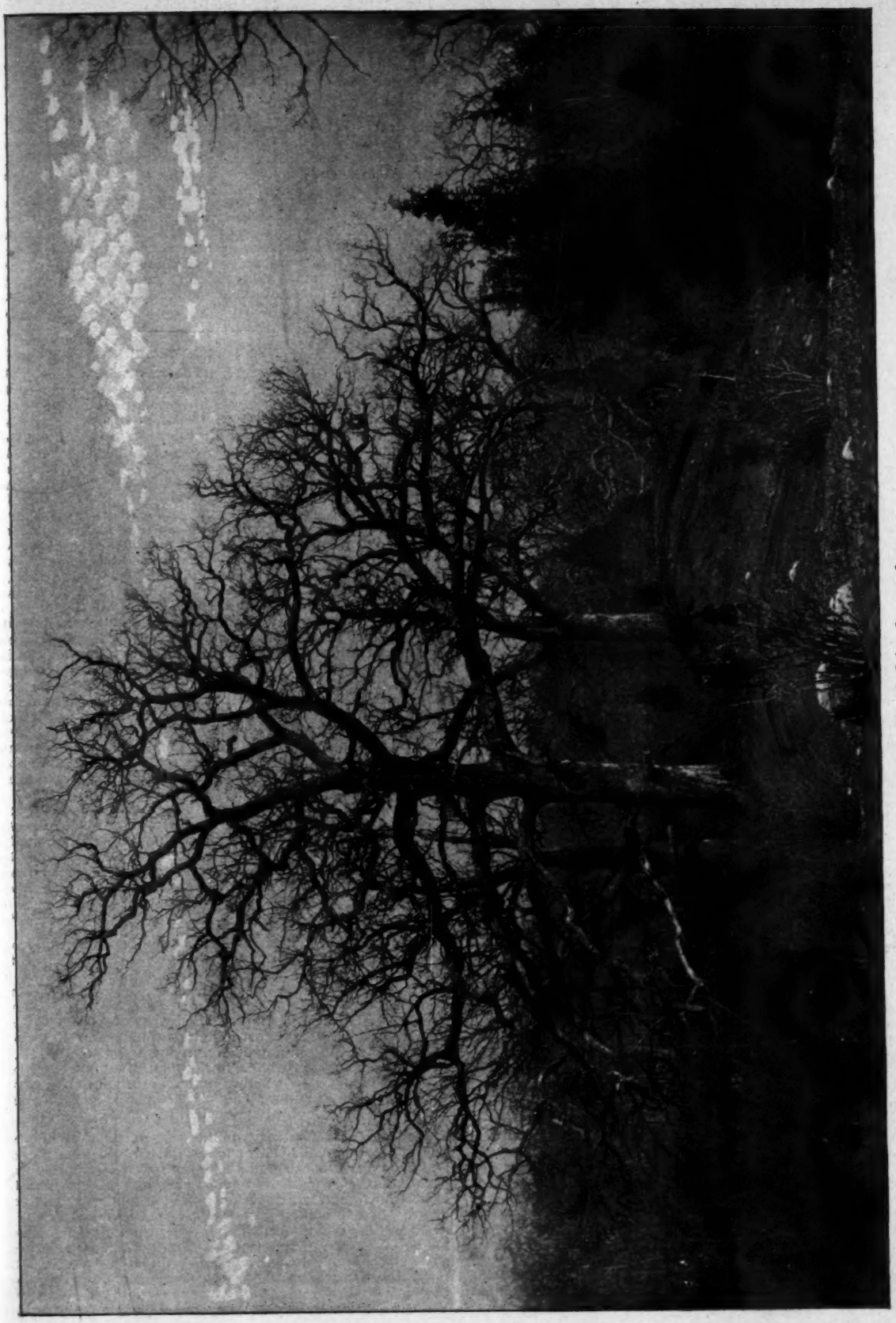
In this genus is also to be found one of the handsomest large Ferns in cultivation, *Dicksonia Schiedei*, with long pendulous fronds which sometimes attain a length of twelve to fifteen feet. The fronds are bipinnate, light green in color and glaucous on the under side, and the stipes and crown of the plant being densely covered with silky hairs adds much to its attractiveness. *Brainea insignis*, the only member of its genus and a native of China, is also a valuable addition to any cool-house collection. It is of moderate growth, the fronds averaging from two to three feet in length, and is said to develop a trunk four or five feet high, though there are probably but few of that size in cultivation, its growth of trunk being very slow. *Woodwardia radicans* and *W. orientalis* are very easily-grown cool-house species, the former being especially graceful in habit, its long pendulous fronds hanging down like a delicate green drapery, and in a good specimen frequently attain a length of six to eight feet. Another interesting point in connection with this Fern is the proliferous habit of its fronds, the young plants being produced in quantity on the upper surface of the frond. A number of the Pteris and Aspleniums are also suited to this purpose, prominent among the former being *Pteris scaberula*, an excellent Fern either as a specimen or for cutting, though it has one drawback in being partly deciduous in the winter.

The well known *Pteris argyræa* and *P. serrulata* in its many forms are too widely distributed to need further recommendation at this time. It may be added that the large-growing Ferns to which attention has been invited will also be found of great utility as out-door ornaments in summer, providing they are placed in a somewhat sheltered and shaded position and well supplied with water.

Holmesburg, Pa. *W. H. Taplin.*

Protection Against the Striped Cucumber Beetle.

THE striped Cucumber Beetle (*Diabrotica vittata*, Fabr.), is a most malignant enemy to battle where it has once gained possession of the field. The oft-printed formulas that abound in our horticultural journals generally prove signal failures when put to the test in anything like a severe attack. At best, applications to the foliage are expensive and more or



The Waverly Oaks.—See page 85.

less detrimental to the plants. Gardeners and entomologists are at last pretty well agreed that some protection placed over the hill before the plants appear above ground will prove most satisfactory in the long run. The fact that such protection often aids materially in preventing injury from frost is an important point in its favor, as the *Cucurbitaceæ* are among our tenderest open-air plants.

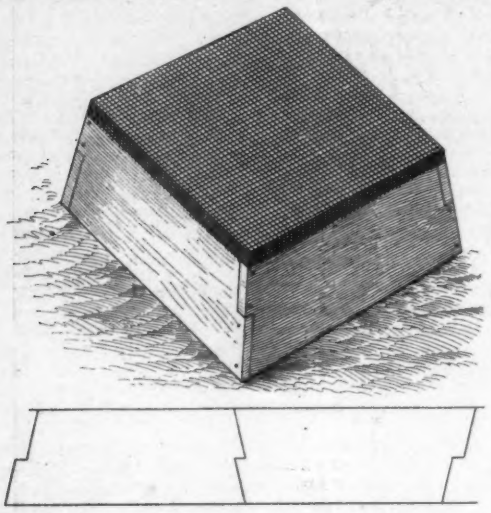


Fig. 21.—A Simple Plant Protector.

The protector illustrated in the accompanying sketch has the merit of being strong, light, durable and economical of storage, as well as being entirely efficient and cheap. The difficulty with most of the plant-protectors in use is that they are too fragile, too costly or too bulky for convenient storage. The one here shown is made of five-eighths-inch undressed pine lumber, covered over the top with ordinary wire mosquito netting. The frame may be made sixteen inches square at the top, and the sections are cut so that the bottom is slightly larger, giving flare enough to admit of nesting the boxes together for convenient storage. By cutting the boards in the manner shown in the drawing, they may be "double-nailed," which greatly adds to the strength of the frame without increasing the weight or cost.

University of Wisconsin, Madison. *E. S. Goff.*

Orchid Notes.

Ærides Roebelenii is now flowering here. It is one of the later additions to this extensive genus, but is no great acquisition. It much resembles *A. quinquevulnerum* in its erect, sturdy habit and dark green, glossy leaves. The ascending racemes are about one foot long, bearing about thirty flowers, small and greenish white, with a fringed incurved lip tinged with rose at the apex. There is little to recommend this species except its free blooming quality and the pleasant fragrance of the flowers. It was introduced some five years since from the Philippines, and grows freely in the warmest house.

Odontoglossum Rossii was imported in such vast quantities a few years ago and sold so cheaply that it became the best known of the genus; but, to keep it in good condition for any great length of time, it should be given the treatment recommended for *Lælia anceps* and other Mexican Orchids. It quickly deteriorates in the damp, sunless houses usually occupied by this genus. It is an extremely free blooming kind, and a well grown plant is literally covered with flowers, which remain a long time in perfection in a cool, dry atmosphere. It is admirably adapted for cutting, and if a number of plants are grown and care is used in forcing or retarding the flower-buds, they may be had in bloom more than half the year. *O. Rossii* has a very wide distribution in Mexico, and in some localities it grows in immense quantities. There are also a great many varieties, consequent on the great variation of climate; and in some few cases on supposed cross-fertilization with allied species. Since the variety Majus was introduced the typical form appears to be lost, for one seldom hears of plain *O. Rossii*.

Odontoglossum elegans, a very rare and beautiful plant, is flowering freely with us. It is supposed to be a natural hybrid between *O. cirrhosum* and *O. cristatum* or *O. Hallii*. The habit and inflorescence much resemble those of *O. cirrhosum*, but the flowers are larger and have broader segments. The color is pale yellow, with heavy blotches and bars of reddish brown, and a purplish crimson blotch near the base of the petals. The narrow lip is reddish brown at the base, with the front portion white; the crest is yellow, and the column white. The plant was introduced from Ecuador about ten years since, and but few are now in cultivation. It grows freely at the warmest end of the cool-house, but requires a good season of rest and must not be overpotted.

Kenwood, N. Y. *F. Goldring.*

Vanda Amesiana is one of the most pleasing of the Orchids now in flower. I lately saw a large number of plants, each bearing several spikes of bloom, in the houses of Messrs. Low & Co., of Clapton. The flowers are so delicate and pretty, and, moreover, are so deliciously fragrant, whilst the plant itself has such a healthy, business-like appearance, that this species cannot fail to become one of the most useful and popular of tropical Orchids. *W.*

Kew.

Brussels Sprouts.

THE seeds of this excellent form of Cabbage should be planted in the house, hot-bed or greenhouse as early as the first of April, as it requires a long season to perfect its growth. The young plants resemble those of the Cauliflower, and will be large enough to set in the open ground as soon as the weather and soil favor a free growth; till then they should be kept in flats of earth, not crowded, and they may need more than two transplantings. If so, each change will have a tendency to develop roots, and if the plants have also been exposed to the free air and sunlight, they will be strong and healthy. A soil to grow Brussels Sprouts should be strong, and also well enriched. The early part of the season's growth is required to develop stature and leaves to the plant; later in the season, the leaves, beginning with those first formed, and near the ground, fall off, and from their axils buds or small heads of Cabbage develop spirally around the stem, and quite as thickly as they can cluster. This process continues till fall. At maturity the plants having the most perfect collection of buds are saved for wintering. Some never have heads large enough to use, and some will bloom like a green Rose; these are failures. Take up the selected plants before the hard frosts, with abundance of earth; bring them into a cool cellar, either light or dark; set the roots not too close together in the ground, give them water once, and the season can be prolonged till the spring months. The green worm is as troublesome as it is to other members of the Cabbage-family, but the plants are quite hardy, and repay the endeavor to grow them.

They are prepared for the table by first separating them from the stalk and removing the imperfect leaves. After lying in salt and water for half an hour, they are boiled for twenty minutes in water to which a little soda has been added, and are served with either cream, butter, or vinegar sauce. They have a very pleasant cabbage-flavor, peculiar to themselves.

West Springfield, Mass. *W. H. Bull.*

Doronicum Harper Crewe.—This is a most interesting plant, belonging to the *Compositæ*, with flowers of the very brightest yellow, somewhat larger than a silver dollar, with about forty-four very narrow florets. As a winter-blooming plant in a cool greenhouse it is most effective, the flowers remaining wide open all night. The leaves are heart-shaped, of a very dark green, and growing close to the soil. I have plants in six-inch pots which have been in flower for two months, and at no time have there been fewer than three flowers at once. It delights in a sunny position and a temperature of forty-five to fifty degrees at night. This plant can be recommended as a very good subject for amateur culture.

Seed-Sowing.—The many failures experienced in the germination of very small seeds, such as those of Begonia, Gloxinia and Calceolaria, is the result of too deep covering in nine cases out of ten. My plan of treating all small seed is this: I use light sandy loam, which is heated to a temperature of 120 degrees; one-half is then passed through a sieve having meshes half an inch in diameter. This is then spread to the depth of an inch in boxes. The other half of the soil is passed through a sieve having meshes a quarter of an inch in diameter, and a portion of this is spread over the first soil, made very smooth by being slightly pressed with a board having a planed surface. The seed is then evenly sprinkled over it, and in the case of very

fine seed it is not covered at all with soil. The whole is then carefully watered with a fine rubber sprinkler. Seeds such as Aster, Stocks and Primroses are covered with soil to the depth of about the thickness of the seeds. The finest seeds are covered with sheets of glass, on which is kept a single covering of paper, either an old newspaper or light packing paper. The coarser seeds are covered only with paper, and at no time until germination takes place is any direct light admitted. After germination the paper is removed at night, and again replaced for a while during the day-time. A safe temperature for most seeds is from fifty-eight to sixty-five degrees.

Pearl River, N. Y. *John Thorpe.*

Lachenalia Nelsoni.—The admirers of hardy plants owe a debt of gratitude to the late Rev. J. Nelson for the valuable garden varieties of the common Moss Pink (*Phlox subulata*), which were originated by his skill, and have proved so valuable in the spring garden. Many other admirable hybrids were produced by this enthusiastic amateur, and among them the one named at the head of this paragraph. Of all the Lachenalias we have tried this is best adapted to general use. The flowers are bright coral-red in bud, and golden yellow when expanded; they are borne on stems six to eight inches long just above the foliage, which is prettily mottled with brown. The value of Lachenalias as winter-blooming plants lies in the durability of their flowers, which last in good condition for nearly two months. Nothing is more simple than the culture of these bulbs. They should be potted in September, three in a four-inch pot, and in winter kept in a light place, where the temperature does not fall lower than forty-five degrees; they will then flower in January and February. After flowering the foliage soon dies down, when the bulbs require no water until potted again in September. There is no reason why these plants should not become popular for window-culture, as the conditions necessary to the successful flowering of a Geranium in winter suits *Lachenalia Nelsoni* admirably, both, in fact, being the offspring of plants native to South Africa.

Passaic, N. J. *E. O. Orpet.*

Christmas Roses.—My experience with this species of Helleborus and its varieties agrees with that of Mr. Gerard. This winter and the preceding one cannot be accepted as a test of their hardiness. Even protected by the ordinary hot-bed frames and sashes, I am far from believing that they would flower during a winter as severe as that of 1884–85. To induce them to flower in such a winter the frame would need the further protection of a lining of litter besides mats and shutters. Cultivated under such conditions, they lose their claim to be considered hardy, and above all, their charm. The majority of people who cultivate hardy plants can enjoy them only as such, and they should not remain under any delusion about Christmas Roses.

Wellesley, Mass. *T. D. H.*

The Forest.

The Need of a Forest Policy in Pennsylvania.

THE need of a more rational system of forest management is as great in Pennsylvania as in any of her sister states. That this has been a settled conviction on the part of many thinking men is apparent from the frequency with which forestry matters have been discussed before her agricultural and other societies. In 1881 the State Board of Agriculture appointed a committee on forestry, which, in the succeeding year, rendered a carefully prepared report, which was the result of inquiry in every part of the state, and gave answers to the questions as to (1) the approximate amount of old timber in each county, (2) the amount of young growth, (3) the best protection against fires, (4) the legislation which seemed desirable, together with some others of less moment.

These inquiries developed a widespread feeling that, although Pennsylvania had been one of the best timbered states of the Union, there was now need of a husbanding of the remaining forest resources, and some encouragement to reforesting and protection from fires. How to secure these ends gave rise to various suggestions more or less practicable, which, from time to time, were brought to the attention of the Legislature. But they appeared—at least to the Legislature—to lack distinctness and purpose, or to be impracticable, and nothing came from them. In 1888 the Governor of the Commonwealth, acting under a joint resolution of the Legislature, appointed a committee of five citizens to consider and report upon the forests of the state, and to recommend legislation if they saw fit. No provision was made for the expenses of such committee, and it was left to determine its own methods and scope of work. None of the committee felt that, under the circumstances, any considerable personal examination of the forest-condition and needs of the state could be made; hence they sought to obtain all the information possible through correspondence. And by personal letters chiefly, and a circular to county officers and corporations, collected a large number of facts as the basis for their report.

The report which they rendered was a brief and compact résumé of the general forestry question as it exists in the eastern United States to-day, fortified by various facts and considerations which had special bearing on the condition in Pennsylvania. That a more elaborate report was not presented was, perhaps, a disappointment to some, but it was felt that, in the absence of authentic and definite information, a longer report, founded, as it must have been, on general principles alone, would carry no additional weight, and might even be of lessened value. Accompanying the report was the draft of a bill, which it was hoped might commend itself to the Legislature. The main features which it embodied were as follows:

The appointment of a permanent forestry commission of three members, with power to elect a secretary, who is the working member of the board; also such wardens and agents as they may deem necessary, and to define their duties. The duties of the commissioners were to ascertain the true state and condition of the forests of the commonwealth; their relation to the needs and industries of the people; the rate of destruction by different means, and the prosecution of offenders of the laws relating to forests. The means necessary to accomplish these purposes were detailed as fully as seemed practicable.

Circulars or bulletins of information on forestry methods were to be issued for the benefit of landholders. The subject of forestry was to be brought before the teachers of public and normal schools and various associations by a lecturer to be provided by the board, and by the distribution of *Forest Leaves*, the publication of the Pennsylvania Forestry Association. Special effort was to be made for securing better observance of the laws regarding trespass upon and firing of forests, by the posting of notices of these laws in all suitable places.

After presentation to the Legislature the bill was referred to the Committee on Agriculture for further consideration. The advocates of the measure were granted a hearing before this committee, and endeavored to explain further the intent and value of it. No direct report or reply was ever received as a result of this interview, but it was understood that the bill was considered to be impracticable, even in a modified form, and it was never reported back to the House.

Whatever may have been the defects of this bill, it was framed with the intent to meet what many believe is a growing, and soon to be an imperative, need in our state, namely: Some systematic care and attention to the conservation of our forests, and their perpetuation over those large areas, chiefly mountainous, which ought to be not only continuously productive, but also centres of salubrity, and checks and barriers to climatic extremes. Meanwhile, the interest in forestry has continued to increase, and, although most active and visible in the eastern part of the state, is nevertheless becoming more and more evident in the others, and includes the intelligent, thinking men of various occupations and surroundings. From letters received from correspondents it seems in place to note very briefly the opinions of three, which may be taken as representative.

A farmer and lumberman of one of the north-eastern counties says: "The time is near at hand when no question will be of more vital importance to the Pennsylvania land-owner than that of how best to restore the wasted woodlands of the state. In solving this problem there is abundant room for both thought and work. It will not be wise to leave the work of restoration wholly in the hands of Nature, for while Nature can do and is doing much to reclothe the waste places in our forests, Nature does not always, in selecting species, give us those most useful to us, nor can she unaided successfully cope with tramps and incendiaries, private and corporate, whose carelessness or malice often, in a few hours, destroys the work of years. How can Nature's generous efforts in our behalf be best assisted? The state can do something. The act of June 1st, 1887, is good as far as it goes, but it does not afford adequate protection against irresponsible depredators. Forestry associations can do something, but much must be left to individual work. We have learned only too well how to get rid of trees, we need now to learn how to replace them. We shall find the last problem a harder one to solve than the other."

An engineer in active service with a mining company, having written a letter to the *Scientific American* on the timber

supply and forest-condition of northern Pennsylvania, says: "I wrote the article to which you refer entirely from a sense of duty—to raise the alarm, to call attention to the fact that people were being misled in the matter of bark and lumber supply left in the northern part of this state. Men who have traveled only on the railroads or who get their information from some one who is trying to 'boom' a county or section of country, write as positively on this subject as those who have traversed the valleys and climbed the hills where the lumberman is carrying on his work of destruction. I have none but a general interest in the matter—no lands, or bark, or timber for sale, nor do I expect to have; but it grieves me to see such ruthless destruction, such vandalism—if I may apply the word to the destruction of our forests—as is going on all around us. I am quite well acquainted with the condition of things in Tioga, Lycoming, Sullivan, Potter, Elk, Forest, Jefferson, Clearfield and Cameron Counties, but my knowledge of the state of affairs in McKean and Warren is quite limited. . . . One thing you may rest assured of, I put the case in its mildest form in my letter to the *Scientific American*."

One of the foremost politicians of the state, himself a large landholder and business man, says: ". . . Sooner or later these lands (those which have been stripped of their timber) fall back upon the county through arrears of taxes. The time is coming, if not already here, when the need of some adequate forestry laws will be seriously felt."

State College, Pa. *William A. Buckhout.*

Correspondence.

Australian Trees in California.

To the Editor of Garden and Forest:

Sir.—The issue of Garden and Forest for December 4th mentions the probability of the Kauri Pine being adapted to California. That it will flourish in certain portions of the state is not a matter for surmise, as a stately specimen of the tree forty feet high stands upon the grounds of Mr. Sawyer, at Montecito, near Santa Barbara; nevertheless, neither the planting of this nor its equally beautiful and hardy congeners, the Dacrydiums, have been prosecuted to any noticeable extent in California.

Hitherto the impression has prevailed that Acacia and Eucalyptus were about the only genera that would conform themselves readily to our conditions of soil and climate; and the wonderful collection of Mr. Ellwood Cooper, at Santa Barbara, and the successful growth of no less than forty-six species of this latter interesting genus at the State Forest Station at Santa Monica, have helped, perhaps, to give color to this theory.

At this date (December 16th), and at this station, unprotected seedlings of *Lagunaria Pattersoni* are appearing vigorous and healthy, and when it is recollected that this tree is a native of the tropical Queensland "scrub," we may be warranted in holding somewhat optimistic views of the possible future expansion of the Australian silva in this state.

Outside of the *Leguminosæ*, *Protaceæ*, *Myricaceæ* and *Sterculiaceæ* our gardens and parks show a striking poverty in Australian plants—a poverty only less regretable than the absence from them of our native trees and shrubs.

Mr. F. M. Bailey, in his recent (1888) monograph on Queensland woods, enumerates 537 species, of which only twenty-eight per cent. are tropical or ultra-tropical, leaving nearly 400 species of extra-tropical sorts that would doubtless accommodate themselves to various parts of California.

The locality first mentioned (Montecito) is exceptionally favored, even for California. Sheltered from strong winds, near enough the coast to insure the atmospheric humidity requisite for most jungle plants, and practically exempt from frost, it furnishes the climatic requirements of a semi-tropical arboretum.

In the gardens referred to is a noble Laurel—the *Persea gratissima* (Alligator Pear)—which, in August last, was fairly loaded with green fruit, and from which I recently received ripe fruits. In the same grounds, and amongst a unique collection of Palms, stand regal specimens of *Archontophœnix* (*Seaforthia*), *Cunninghamiana* and *Cocos plumosa* quite twenty feet in height. These two Palms, though no uncommon features of Santa Barbara gardens, have nowhere else in the state made themselves so fully at home. Ultimate success with Australian and other exotic plants in California depends upon close and impartial observations and records of soils and climate. The lowest official temperatures recorded at Los Angeles during many years past is twenty-eight degrees, and by private record only twenty-six degrees has been touched; yet six miles distant, at the Ostrich Farm, the mercury has fallen to fourteen degrees—an amount of cold which killed the immature wood of *Nerium Oleander*, and quite sufficient to have destroyed any Queensland tree yet introduced here.

On the other hand, six miles in another direction (the Cahuenga) the Coffee shrub and *Artocarpus incisa* (Bread-fruit-tree) have grown unimpaired by frosts during four years; and though no authentic meteorological data are at hand from that quarter, the evidence shown is sufficient to warrant the hope for a liberal measure of success with even tropical Australian plants. The natural advantages of this point or of Montecito for acclimitization gardens are far superior to those of the Stanford Arboretum, and probably have no parallel upon this coast or within the United States.

Los Angeles, Cal. *William S. Lyon.*

The Action of Root-hairs Illustrated.

To the Editor of Garden and Forest:

Sir.—A letter from Mr. James E. Reeves to Professor Joseph Leidy contains the following statements: "You may have noticed in the Associated Press dispatches two weeks ago, report of the re-interment of the remains of the Confederate General Walker, who was killed in the battle before Atlanta, July 22d, 1864. The specimen I have the pleasure of sending you is a part of the mossy network which completely covered the remains.

"The burial place was in a dry ferruginous clay, and the vault preserved unbroken by a thin crust arch which prevented the falling in of the superincumbent earth; and thus the remains—which consisted of nothing more than the bones, and some of these broken into dust—were all easily brought into view, with their remarkable covering."

Through the kindness of Professor Leidy I have had the privilege of examining the fragment of this "mossy network." I find it to consist of the ultimate rootlets of some plant, whether herb, shrub or tree I have no means of knowing. But the most striking thing revealed by the microscope is the vast number of root-hairs with which these rootlets are covered. It is quite clear what their function was. In fact, they afford an illustration of the absorbing powers of such appendages. Through their activity the mortal remains of the brave Confederate soldier had already had their resurrection into a new life by the leaves and flowers which covered his grave.

The fact taught by these root-hairs is well recognized, but I have never before seen so striking an illustration of it.

University of Pennsylvania. *J. T. Rothrock.*

Kalanchoe carnea.

To the Editor of Garden and Forest:

Sir.—Mr. Dana's opinion of this plant will be endorsed by most cultivators; and yet the Kalanchoe has merit as a window-plant. It bears the dry atmosphere of hot rooms; it wears well, and its perfume is very agreeable where confined; and it may be much improved by selection. Already I notice some plants with decidedly brighter colors than the rest. It may be possible to cross it with some brilliant-colored species of Kalosanthes, such as *K. coccinea*, and if so, we may hope for some really valuable additions to our list of plants. I well remember how insignificant were the earliest comers among the Chinese Primroses (*Primula Sinensis*), with their puny flowers and insipid coloring. By selection extending over thirty-five years we now have some of the most beautiful colors and the most effective early winter-flowering plants in a class of plants that was once almost despised.

Pearl River, N. Y. *John Thorpe.*

Recent Publications.

The California Fruits and How to Grow Them. By Edward J. Wickson. Dewey & Co., San Francisco. 1889.

Perhaps no country in the world excels California in natural adaptation to the production of fruit and its preservation. It combines the three great advantages of abundant heat, continuous sunshine and dry air, and these, taken in connection with a soil admirably suited for fruit-culture and a long growing season, ensure an abundance of fruit, which matures early and is of good quality. Besides this, the rainless summer, with its dry heat and steady sunshine, gives exceptional advantages for curing fruit in the open air. All these conditions would naturally prompt Californians to engage in fruit-growing; but when we consider how recently this industry was in its infancy, and consider, too, that the pioneers in the enterprise came from regions where the climate was radically different from that of California, we cannot but wonder at its rapid development. Of course many mistakes were made in the

beginning, and as there were no traditions of culture and no experience to rely upon, the early fruit-growers were compelled to experiment for themselves. Fortunately, they were men of exceptional intelligence, and the reports of their papers and discussions at the meetings of the State Agricultural Society and other bodies gave great aid to new-comers. It is rather remarkable, nevertheless, that so complete a book as this of Mr. Wickson's could be prepared out of actual experience in the orchards and gardens of the state. This manual is very comprehensive in its plan, treating generally of the climate of California and its modifications, giving full cultural directions to the fruit-grower from the proper method of clearing the land and of planting the nursery down to the preparation of the fruit for market. No doubt it will be found of great value to all those who are desirous to embark in fruit-growing in that region, but who have no practical acquaintance with the methods or materials to be used. The book, however, will find many readers outside of California. The wonderful variety of orchard fruits, semi-tropical fruits, small fruits and nuts, whose cultivation is here described, will astonish those who are not familiar with the resources of the Golden State. Very interesting is the chapter on the wild fruits of California and on the old fruits that were introduced into the early missions. The section of the work relating to the preservation of fruit is comparatively brief, but to the eastern reader it has a peculiar attraction on account of the magnitude of the operations which are there described.

Exhibitions.

Flowers at the Water-Color Exhibition.

THERE are some fair flower pictures in this year's water-color collection, but none of remarkable excellence. Miss Greatorex has sent none of her large paintings in which the color of great masses of blossoms is insisted upon with such splendid decorative effect; Mr. La Farge none of his exquisite little studies where the whole of a blossom's beauty is shown and a soul is suggested for it that only the poet's eye can see in nature; and Mr. Weir none of those dainty Roses which are dreams of flowers rather than real flowers. Instead we have a number of little works where simple portraiture of a more prosaic sort is attempted, and a few where a general decorative effect has been tried for, with flowers as the main but not the only motive.

Perhaps the most important of all is Miss Hooker's "Carnations," a large picture with the yellow, pink, white and dark red flowers, half in a white glass bowl and half on a white table-cloth. The composition is effective, the lighting well conceived, and the flowers well drawn, and neither too rigid nor too soft. In color the general effect is excellent, but this result has been attained by some sacrifice of strength of tint in the flowers themselves. Were they as truthfully portrayed in this as in other respects, there would be no deficiency to note in an excellent picture. By comparison all the other paintings of Carnations on the wall seem poor enough. As a rule the form of the flower has been neglected; we see only a featureless mass, sometimes too hard, more often too soft, without the vigor of outline or the beauty of detail which give a Carnation its character.

Roses are even more in favor this year than Carnations, usually one of the double pink hot-house varieties being chosen. Here again the chief fault is lack of form—or, perhaps, lack of substance. Even when the form is well made out the Rose looks as though it were composed of some wishy-washy material instead of the pliant yet thick, the soft yet waxy, the delicate yet heavy material that Nature uses. Much the best Roses in the collection, I think, are those by Miss Grace Pomeroy, which are unfortunately skied over a door in the west room. They are only a few flowers simply placed in a common ginger-jar, with the white paper for background. But they are well drawn, frank and true in color, and firm in body without being in the least "hard" in the painter's sense of the word. It is especially pleasant to see the foliage as well executed as the flowers, and not allowed to fade away into the background as though of minor importance. Miss Pomeroy calls these Roses Bon Silène. Would not a florist call them Papa Gontier? Miss E. E. Lampert does not paint Roses badly, but neither is her work exceptionally good; and most of the others who have tried them may well be left unnamed.

A different kind of work is called for by Hollyhocks, and Mrs. Nicholls' bold touch and nice feeling for brilliant color have represented them well, in tall stalks with white and red blossoms. A delicate little picture is Miss Abbat's "White Sweet Scabious," where the flowers are grouped with other objects and the general color effect is good. Most of the Pansies are blotty and watery—devoid of texture although nicer very often, in color. E. M. Scott sends some Nasturtiums in a glass bowl which deserve mention; Miss Williams an excellent study of pink Chinese Primroses growing in a pot, and H. A. Pressey a group of Azaleas in a green glass bowl, remarkable for the delicate completeness with which the fragility of the greenish white petals and the exquisite pliant outline of the blossoms are rendered. Miss Redmond's "Grapes" should not be overlooked, though they, too, are "skied"—California Grapes, blue, red and green, as hard, yet velvety and juicy, as the sun of the Pacific had made them.

But much the most interesting pictures of flowers in the collection are two which lie outside the customary limits of flower-painting—two landscapes in which masses of growing flowers form the dominant feature. One is Mr. Ross Turner's brilliantly handled "Garden of Lilies, Bermuda," where we see a Lily plantation in the foreground, with touches of brighter hues to relieve its borders, white houses in the middle distance, and the background on a slope of vivid green and interspersed with blackish evergreens, and a cloud-flecked sky that is likewise frankly green, although, of course, quite pale in tone. We can believe anything of the color in Bermuda, such marvels have so often been told us; and Mr. Turner's sky proves its verity by its harmony with the other tones in his clear scheme of color. His Lilies are really not painted at all; there is just a stretch of white paper flecked with yellow, to stand for their mass. But this mass is suggested in such delightful fashion that we are content to forget for once that Lilies have beautiful forms, enjoying the radiance of the snowy sheet which is stretched before us.

The second flowery landscape is Mr. Bunker's "Aster Garden." Here we have the summer of the north as against Mr. Turner's winter of the south; and it is hard to choose between their contrasting charms. Nothing could be more attractive to eyes tired of our winter's bareness than this huddled garden corner where great masses of China Asters (painted, like Mr. Turner's Lilies, for color effect simply) grow beneath a hedge of Sweet Peas, with Coreopsis starring the tall grass in front of them, and what seems to be an orchard stretching its shadowy breadth in the background. Of course, this is not the way to paint flowers when one wants to show the flowers themselves; but when it is their effect that is wanted—their beauty as they grow in masses of softly blended or sharply contrasted colors—then few water-color painters of the day could expect to succeed better than Mr. Turner and Mr. Bunker have succeeded here.

New York City. *M. G. Van Rensselaer.*

Meetings of Societies.

At an adjourned meeting of the New York Forestry Association held at Columbia College on Monday afternoon, February 10th, a revised Constitution was adopted, and the following officers were elected: President, Morris K. Jesup; Vice-Presidents, Dr. C. K. Adams, President of Cornell University; Grover Cleveland, Willard Cobb, Mrs. D. G. Croly, George William Curtis, Rt. Rev. W. C. Doane, Warren Higley, Seth Low, President of Columbia College; Warner Miller, C. L. Merriam, Dr. J. S. Newberry, Ellis H. Roberts, Carl Schurz, Rev. Dr. R. S. Storrs, Dr. H. E. Webster, President of Union College; Gen. Egbert L. Viele; Treasurer, Thomas Denny, 30 Pine Street, New York; Recording Secretary, E. B. Southwick; Corresponding Secretary, J. B. Harrison, 52 William Street, New York; Executive Committee, William Potts, 35 Liberty Street, New York; Professor D. S. Martin, Edward M. Shephard, Benjamin Strong, W. A. Stiles.

The officers of the Association are *ex officio* members of the Executive Committee, and three members will constitute a quorum for the transaction of business. The Committee is authorized to fill all vacancies, and to elect committees for various purposes, and is clothed with all the powers of the Association as its representative when the Association is not in session. It was provided that no debts can be contracted, nor any appropriation made in excess of the money in the treasury available for the purpose.

The object of the Association is the promotion of effort for the maintenance of forest conditions on the mountain lands of the state. It does not now commit itself to any particular measure as final, or entirely adequate, but it will, as far as possible, co-operate with the State Forest Commission, and with all associations and citizens in favor of any judicious and

practical plans for the preservation and rational management of the Adirondack forests. It will devote itself systematically to the diffusion of knowledge and the propagation of sound ideas regarding the functions and value of this mountain forest region as the source of the great water-ways of the state, as a sanitarium, as a source of timber supply and as a preserve for fish and game. The Association invites the largest possible membership. The fee is one dollar per annum, which should be sent to the Treasurer, whose address is given above.

Notes.

Orange-growers in southern California have sold their Washington Navel Oranges on the tree for $2.75 a box.

Snowdrops were in full bloom in the open ground in gardens near Boston last week, fully five or six weeks earlier than in ordinary seasons.

The December number of the *Journal of the Japanese Horticultural Society* contains a colored figure of a remarkable green-flowered Chrysanthemum of the Japanese type.

Professor J. T. Rothrock and Professor W. T. Wilson, of the University of Pennsylvania, have becme associate editors of *Forest Leaves*, the organ of the Pennsylvania Forestry Association.

The best Baldwin apples from Maine and Canada sold at $6.25 a barrel wholesale in Liverpool the first week in February; Russets ranged from $4 to $5.50, and Greenings from $4.50 to $5.

High praise is given in German journals to the Messrs. Henderson's Tuberose Excelsior Pearl, introduced some ten years ago, and to Albino, which they have recently put on the market, but which was first exhibited by Messrs. Mitchell at Chicago in 1887.

We recently spoke of the probability that the Okra-plant would soon be cultivated for its fibre. It is not generally known that in Texas it is already used for making lariats. In France it is used for making paper, and in India it is used to adulterate jute.

The House of Representatives of the General Court of Massachusetts passed a resolution on the 5th of February ordering the State Board of Agriculture to inquire into the condition of the forests in the state, the need and method of their protection for sanitary and other reasons, and the encouragement of tree-planting, and report thereon to the next General Court.

A correspondent from Media, Pennsylvania, sends the names of twenty-three plants which were in bloom there in the month of December. Of these, *Brassica nigra*, *Capsella Bursa-pastoris*, *Lepidium Virginicum*, *Viola cucullata*, *Stellaria media*, *Antennaria plantaginifolia*, *Nepeta Cataria* and *Symplocarpus fœtidus* flowered through the month of January.

California journalists call attention to a fact which would seem strange enough in any portion of the globe less diversified in its surface than their state. At the time when the Central Pacific Railroad was blockaded for a week or more by gigantic snow-drifts, Roses were blooming and Oranges and Lemons were ripening their fruit only seventy miles away.

In the last quarterly report of the Kansas State Board of Agriculture the number of acres of artificial forest is given by counties. The totals are as follows: Acres of Black Walnut, one year old and over, 17,054; of Maple, 14,171; of Honey Locust, 3,415; of Cottonwood, 56,760; of other forest-trees, 120,172. The total value of the wood marketed for the year 1889 is placed at $207,604.

A statue to Mr. James S. T. Stranahan is about to be erected in Prospect Park, Brooklyn, as an acknowledgment of his many services to the city, and especially of the prominent part he played in the establishment of the park itself. It is a pleasure to know that the work bids fair to be a genuine ornament to the beautiful pleasure-ground, as the sculptor chosen is Mr. W. F. MacMonnies, a native of Brooklyn, who has recently been studying in Paris, and of whose abilities Mr. St. Gaudens, his former master, speaks in the highest terms.

The fourth annual Orchid Show, which opens to-day at the Eden Musée, promises to surpass in varied interest any of its predecessors. As in former years, the exhibition will be under the direction of Messrs. Siebrecht & Wadley, who announce that they will contribute from their own collection 800 plants of some 300 distinct varieties in full flower. Besides these, choice plants from several of the most important Orchid collections in various parts of the country have been sent here at great risk and expense. The exhibition will remain open for ten days.

Herr Otto Froebel, of Zurich, recently explained in *Gartenflora* that, after long experimenting, he had found *Rosa laxa* the best stock for grafting. It is a central Asiatic species, the seed of which was sent him some twenty years ago by Dr. Von Regel. It makes no suckers, easily accepts grafts of all kinds, and is thoroughly hardy in Germany; moreover, its stem naturally grows straight, smooth, unbranched and almost destitute of thorns to a considerable height, so it is especially well fitted for producing standards, while the early ripening of its wood peculiarly fits it for winter forcing.

A new hybrid Rose, raised at the Arnold Arboretum by Mr. Dawson, is just now flowering for the first time. It was produced by crossing the small, white flowered Japanese *R. multiflora* with pollen from the well known hybrid perpetual, General Jacqueminot. The offspring of this cross has the foliage, somewhat reduced in size, the branchlets and the spines of the pollen parent; the flower is solitary (not clustered as in *R. multiflora*), about an inch across, cup-shaped, semi-double, with bright pink petals; and, moreover, it has the real Jacqueminot odor. The plants, as far as they have been tried, are perfectly hardy, while most of the so-called miniature Roses with bright-colored flowers are tender in the severe New England climate.

Mr. Charles Howard Shinn writes from Niles, California, to the *Evening Post* that wealthy men looking for long investments can do something in the Pacific Coast region that will last for many generations, paying a larger interest than almost any manufactory in America. The investment recommended would be as nearly indestructible as anything human can be. He thinks that on irrigated lands on the lower Rio Grande, along the Colorado, or in portions of California, Nevada or Arizona, Date Palm orchards would last for ages and pay a steady profit. The Olive is already planted in large groves by associations looking for safe and permanent investments, but no one has planted a Cork-Oak forest. Dates, Persian Walnuts, the Figs of Smyrna, the Cork of Spain—all of these are constantly increasing in value; the world's supply is not keeping pace with the demand, and they offer new and attractive channels for large investments of capital as safe and permanent, he thinks, as brick blocks on the business streets of growing American cities.

Bulletin No. 63 of the New Jersey Experiment Station is a record of some tests with Tomatoes. From these it appears that nitrate of soda increased the yield invariably, but was most effective when used in small quantities at a time, and, as would have been supposed, when balanced by applications of phosphoric acid and potash. Contrary to a prevalent belief that chemical fertilizers make garden produce watery, tasteless and innutritious, the Tomatoes on the plots where nitrate was used were not only large, smooth and beautiful to the eye, but they were more solid and had fewer seeds than those on the other plots, and the chemical analysis proved their superior nutritive value. The crop was increased by the nitrate from thirty-five to sixty per cent. on the different plots. Considering ten tons an acre an average yield, and $6.50 a ton an average price, the gain from the use of nitrate ranges from $17 to $39 an acre. This would make an important difference in a state where 15,000 acres are devoted to raising Tomatoes for canneries, besides some thousands more where Tomatoes are grown for market.

Catalogues Received.

ALFRED BRIDGEMAN, 37 East Nineteenth Street, New York; Seeds.—W. ATLEE BURPEE & Co., Philadelphia, Pa.; Seeds.—A. D. COWAN & Co., 114 Chambers Street, New York; Seeds.—HENRY A. DREER, 714 Chestnut Street, Philadelphia, Pa.; Seeds.—B. A. ELLIOTT Co., Pittsburgh, Pa.; Flowers worthy of General Culture, with descriptive and cultural notes.—ELLWANGER & BARRY, Rochester, N. Y.; Fruit and Ornamental Trees, Shrubs, Roses, etc.—R. & J. FARQUHAR & Co., 16 and 19 South Market Street, Boston, Mass.; Seeds, Bulbs, Plants, Tools, etc.—D. M. FERRY & Co., Detroit, Mich.; Seeds.—JOHN GARDINER & Co., 21 North Thirteenth Street, Philadelphia, Pa.; Flower and Vegetable Seeds.—GREEN'S NURSERY Co., Rochester, N. Y.; Fruit Trees, etc.—JAMES J. H. GREGORY, Marblehead, Mass.; Seeds.—D. HILL, Dundee, Ill.; Fruit, Shade and Ornamental Trees, etc.—R. D. HOYT, Bay View, Fla.; Tropical and Semi-Tropical Fruit Trees, etc.—J. T. LOVETT Co., Little Silver, N. J.; Fruit Trees, Shrubs, Evergreens, etc., with cultural notes.—D. LANDRETH & SONS, 21 and 23 South Sixth Street, Philadelphia, Pa.; Vegetable and Flower Seeds.